ABSTRACT

A method for calibrating a medical system capable of generating a magnetic field for tracking a position of a medical device comprises various steps such as defining a mapping volume within the generated magnetic field and placing a metallic object within the mapping volume. A sensor is aligned at a first point within the mapping volume and the magnetic field at the first point is measured with the sensor to establish a first coordinate position (X_i, Y_i, Z_i). The sensor is moved to a next point $(X_i + dx, Y_i + dy, Z_i + dz)$ along one coordinate axis by an added distance component (dx, dy, dz) and the magnetic field at the next point is measured to establish a next coordinate position. The magnetic field at an intermediate point between the first position and the next coordinate position is interpolated to establish an interpolated intermediate coordinate position. The position difference between the interpolated intermediate coordinate position and an actual intermediate coordinate position is determined and the position difference is compared to an error limit. (X_i, Y_i, Z_i) of the next point is set as $(X_i = X_i + dx, Y_i = Y_i + dy, Z_i = Z_i + dz)$ if the position difference is within the error limit and the steps above are repeated along another coordinate axis. The added distance component (dx, dy, dz) is set by decreasing the value of the added distance component if the position difference is not within the error limit and the steps above are repeated along the same coordinate axis. A second embodiment utilizes an extrapolation of the magnetic field at the next point from the first position and calculation of the extrapolated next position. The difference between the calculated next position and the actual next position is then compared to an error limit. If the error limit is exceeded, the magnetic field of an intermediate point is measured and an intermediate position is determined along the same coordinate axis and the magnetic field of the next point is extrapolated from the intermediate position and the procedure is iterated until the error limit is met whereby the sensor is moved to a new point along another coordinate axis.